

REMARKS

Claims 1-20 are pending in this application. Claims 1, 9, 14-17 and 19-20 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al (hereinafter Miller) (U.S. Patent 4,368, 434). Claims 2-3 and 10-11 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. in further view of Applicant's Admitted Prior Art (hereinafter Prior Art). Claims 4-8 and 13 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. in further view of Warren et al. (hereinafter Warren) (U.S. Patent 6,075,807).

Without limitation of the claims, the disclosed embodiments pertain to digital processing of data samples and to data path latency due to processing of samples through delay chains. Delay chains are introduced within digital systems to allow for various processing events, such as timing recovery of samples' boundaries. However, the processing of samples through such delay chains subsequent to the processing events that required them may unnecessarily add to the data path latency and, consequently, lead to suboptimal performance. Disclosed embodiments provide for reduction of the data path latency via reduction of the length of given delay chains. In particular, reduction of the length of a given delay chain is provided by eliminating delay elements from the delay chain, which is achieved by shifting samples out of the delay chain at an output rate higher than an input rate of reading additional samples into the delay chain.

Rejection of Claims 1, 9, 14 -17 and 19-20 Under 35 U.S.C. § 103(a)

The Examiner has rejected claims 1, 9, 14 -17 and 19-20 under 35 U.S.C. 103(a) as being unpatentable over Miller.

Miller discloses a programmable discriminator 14 comprising programmable means for selecting the length of a delay line 20 and the rate at which samples are shifted through the line. The Miller programmable discriminator is intended for allowing demodulation of a variety of FSK signals, depending on the communication protocol being followed (col. 3, lines 39-47).

With respect to claim 1 the Examiner indicates that Miller fails to explicitly disclose the limitation of "in response to receiving a signal of completion of a processing event, reducing the

length of the delay chain by shifting samples rapidly out of the delay chain at a higher output rate than an input rate of samples coming into the delay chain”.

The Examiner further indicates that however, Miller teaches mode control and determining the speed of a signal moving through a delay line in response to determining a CLOCK SELECT, and therefore would have been obvious to one of ordinary skills in the art to incorporate this feature into the system of Miller, in the manner as claimed, for selecting the rate of shifting samples through the delay line.

Applicant respectfully disagrees, for at least the following reasons:

Firstly, the CLOCK SELECT signal of Miller is substantially distinct from a signal of completion of a processing event. The CLOCK SELECT signal of Miller does not change its value during processing of data samples and, therefore, cannot be understood as a signal of completion of a processing event. The Miller CLOCK SELECT control signal determines a suitable rate of shifting data through the Miller delay line, according to one of a plurality of communication protocols (col. 3, lines 40-52, col. 4, lines 19-68). The CLOCK SELECT control signals is provided by a Mode Control Read Only Memory (ROM) (col. 4, lines 19-26). The ROM contains, at various addresses, control signal values corresponding to a variety of applications (col. 4, lines 58-68). Once a communication protocol is selected, the read-only memory card will provide the application specific CLOCK SELECT control signal to the delay line throughout the entire data processing. Miller does not teach nor otherwise suggest accessing the ROM values during processing of data samples. On the contrary, the Miller disclosure is directed at adjusting various parameters of a delay line based on a given communication protocol, prior to communication, i.e. prior to processing of data samples, based on said communication protocol. Therefore, the Miller CLOCK SELECT signal is substantially distinct from a signal of completion of a processing event.

Secondly, within the Miller system implementation, the Miller CLOCK SELECT signal is disclosed as a single value signal fed directly to the Miller delay line 20 (see Figs. 1 and 3); therefore, it cannot determine two shift data rates, i.e. a higher output rate than an input rate, as recited in claim 1.

Thirdly, within the Miller system implementation, the Miller CLOCK SELECT signal controls the shift rate through the delay line 20 according to a selected communication protocol and cannot trigger a reduction of the delay line 20 in response to its detection. The Miller CLOCK SELECT signal is permanently fed to the Miller delay line and has a fixed value in operation, associated with the selected communication protocol.

Consequently, Applicant contends that it would not have been obvious to one of ordinary skill in the art to incorporate the CLOCK SELECT feature into the system of Miller and obtain the step of in response to receiving a signal of completion of a processing event, reducing the length of the delay chain by shifting samples rapidly out of the delay chain at a higher output rate than an input rate of samples coming into the delay chain, as claimed in claim 1.

Furthermore, in regards to claim 1, the Examiner indicates that Miller fails to explicitly teach dynamically reducing the length of the clocked delay chain as data samples continue to be read into the clocked delay chain. However, the Examiner relies on the feature of Miller of determining the length of delay line, in response to determining a delay select, to contend that it would have been obvious to one of ordinary skill in the art to incorporate this feature into the Miller system for reducing the length of the delay line as claimed in claim 1.

Applicant respectfully disagrees at least for the following reason: Similar to the CLOCK SELECT control signal, the Miller DELAY SELECT control signal is also provided via ROM (see Fig. 1 and col 4, lines 19-26 and 58-68) and its value is fixed once a communication protocol is selected. Therefore the length of the Miller delay line 20 is also fixed during communication and does not change or get reduced dynamically as data samples continue to be read into the delay line.

Based on at least this reasoning, the Applicant believes that Claim 1 is patentable in view of the Miller reference. The Applicant further contends that independent apparatus claim 14 corresponding to method claim 1 is patentably distinct over Miller et al. for at least the same reasons.

Even further, Applicant contends that apparatus claim 9 and method claim 15, reciting limitations of claim 1 in the same or similar language, are also patentably distinct over Miller et al. for reasons presented in regards to claim 1.

As claims 16-17 are dependent on claim 15, and 19-20 are dependent on claims 9 and 13, respectively, and incorporate their limitations, the Applicant respectfully asserts that these claims are also allowable over Miller et al., in light of the arguments above.

Rejection of Claims 2-3 and 10-11 Under 35 U.S.C. § 103

Claims 2-3 and 10-11 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. in further view of Applicant's Admitted Prior Art (hereinafter Prior Art). Claims 4-8 and 13 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. in further view of Warren et al. (hereinafter Warren) (U.S. patent 6,075,807). The Applicant respectfully traverses this rejection for the following reasons.

The Applicant incorporates the arguments above distinguishing amended claim 1 from Miller et al.. Furthermore, Applicant contends that of the remaining cited references, Applicant's Prior Art and Warren et al., neither teaches nor otherwise suggests the limitations of previously amended claim 1.

As claims 2-8 and 10-11 are dependent on claim 1 and incorporate its limitations, the Applicant respectfully asserts that Miller, Applicant's Prior Art and Warren et al., taken alone or in combination, fail to teach, suggest or otherwise render obvious claims 2-8 and 10-11. Therefore, Applicant asserts that claims 2-8, 10-11 and 13 are also allowable over the cited art.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

By 

James M. Smith

Registration No. 28,043

Telephone: (978) 341-0036

Facsimile: (978) 341-0136

Concord, MA 01742-9133

Date: 